EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 5 **PROGRAM ELEMENT: 0604512N**
PROGRAM ELEMENT TITLE: Shipboard Aviation Systems

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W2232 CV Launch and Recovery Systems										
TOTAL	**8,774**	**8,430**	**9,052**	**9,975**	**8,950**	**9,170**	**6,820**	**7,106**	**CONT.**	**CONT.**
Quantity of RDT&E Articles	5		4			1		1		

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Navy unique program addresses the Engineering and Manufacturing Development (E&MD) of all systems required to recover and launch Navy/Marine Corps aircraft (fixed wing, rotary wing and Vertical/Short Take-Off and Landing (VSTOL) operating aboard aircraft carriers (CV/CVN), amphibious assault ships (LHA/LHD) and aviation facility ships. This program is funded under E&MD because it encompasses engineering and manufacturing development of new end-items prior to production approval decision. This program includes the E&MD phase of the following systems under Project W2232, including the funding of engineering development models (EDM):

- (U) The Improved Carrier Optical Landing System (ICOLS), which includes the Improved Fresnel Optical Landing System (IFLOLS) and the Long Range Line-up System (LRLS).
- (U) The Aviation Data Management and Control System (ADMACS), including the Integrated Shipboard Information System (ISIS), the Advanced Launch and Recovery Control System (ALRCS), and the Virtual Imaging System for Approach and Landing (VISUAL) increments.
- (U) MORIAH, the integrated wind measurement and meteorological system.
- (U) The Shipboard Optical Landing System (SOLS).

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ENGINEERING AND MANUFACTURING DEVELOPMENT (EMD) because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 5 **PROGRAM ELEMENT: 0604512N** **PROJECT NUMBER: W2232**
PROGRAM ELEMENT TITLE: Shipboard Aviation Systems **PROJECT TITLE: CV Launch & Recovery Sys**

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W2232 CV Launch and Recovery Systems										
TOTAL	**8,774**	**8,430**	**9,052**	**9,975**	**8,950**	**9,170**	**6,820**	**7,106**	**CONT.**	**CONT.**
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- (U) The Improved Carrier Optical Landing System (ICOLS), which includes the Improved Fresnel Optical Landing System (IFLOLS) and the Long Range Line-up System (LRLS), provide longer range, higher accuracy visual landing aids (VLA) for pilots landing on aircraft carriers.
- (U) The Aviation Data Management and Control System (ADMACS) is a real-time, tactical, local area network (LAN) configuration managed for the specific support of the Air Department and the Aircraft Launch and Recovery Equipment (ALRE) data requirements on ships. It also provides connectivity among ALRE systems such as ICOLS, ISIS, ALRCS, and VISUAL; and links Air Operations with other onboard tactical and support networks.
- (U) The Integrated Shipboard Information System (ISIS) employs existing and emerging technology to enable rapid input, collection, processing and distribution of relevant air operations information and then display this information on electronic monitors in all air operations work centers throughout the ship.
- (U) The Advanced Launch and Recovery Control System (ALRCS) introduces modern, modularized computer control systems to the catapults and arresting gear on aircraft carriers, which will support Condition Based Maintenance (CBM), enhance performance, and reduce life cycle costs.
- (U) MORIAH integrates standardized digital wind and meteorological (METOC) sensors to produce an affordable, LAN compatible, wind METOC suite for all classes of air capable Navy ships.

DATE: February 1999

BUDGET ACTIVITY: 5 **PROGRAM ELEMENT: 0604512N** **PROJECT NUMBER: W2232**
PROGRAM ELEMENT TITLE: Shipboard Aviation Systems **PROJECT TITLE: CV Launch & Recovery Sys**

- (U) The Virtual Imaging System for Approach and Landing (VISUAL) provides ship's force and pilots with enhanced images of the aircraft and ship, respectively, in low visibility, day and night conditions.

- (U) The Shipboard Optical Landing System (SOLS) will provide advanced visual landing aids (VLA) for fixed wing, rotary wing and VSTOL aircraft, so that pilots can fly safer and more accurate approaches to all classes of ships.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($ 421) Conducted Technical Evaluation (TECHEVAL) of the ICOLS/LRLS non-stabilized unit (EDM #2) at NAS Lemoore, prior to the TECHEVAL of the stabilized unit (EDM #1) on USS CARL VINSON (CVN 70). Completed documentation for Milestone (MS) III decision to proceed to Full Rate Production (FRP). Conducted MS III decision to proceed to FRP of the ICOLS/LRLS. Provided pre-production support for the unit installed on USS CARL VINSON (CVN 70). Provided engineering and management support to the program, particularly for the transition from the E&MD phase to the production phase.

- (U) ($ 990) Conducted Operational Evaluation (OPEVAL) of the ICOLS/IFLOLS on USS GEORGE WASHINGTON (CVN 73). Prepared documentation for MS III decision to proceed to FRP. Provided pre-production support for the unit installed on USS GEORGE WASHINGTON (CVN 73). Provided engineering and management support to the program, particularly for the transition from the E&MD phase to the production phase.

- (U) ($4,698) Completed design and integration of the CV/CVN variant of the ISIS EDM for installation on USS THEODORE ROOSEVELT (CVN 71). Completed installation and check-out of the ISIS EDM on USS THEODORE ROOSEVELT (CVN 71) and started TECHEVAL. Initiated preparation of documentation for MS III decision to proceed to Low Rate Initial Production (LRIP). Provided pre-production support for the unit installed on USS THEODORE ROOSEVELT (CVN 71) and the ISIS ADM installed on USS GEORGE WASHINGTON (CVN 73). Provided engineering and management support to the program. CV/CVN ISIS EDM for CVN 71 funded under this sub-project.

- (U) ($2,228) Completed design and integration of the CV/CVN variant of the ADMACS/ISIS EDM for installation on USS GEORGE WASHINGTON (CVN 73) and conduct Critical Design Review (CDR) with Fleet users to validate the ADMACS/ISIS EDM design. Started installation of the ADMACS/ISIS EDM on USS GEORGE WASHINGTON (CVN 73). Initiated preparation of documentation for MS III decision to proceed to LRIP. Provided integration support for the various ADMACS increments under development. Provided engineering and management support to the program. CV/CVN ADMACS/ISIS EDM for CVN 73 funded under this sub-project.

- (U) ($ 437) Initiated design of the MORIAH wind/METOC system and completed draft system performance specification. Completed documentation for MS II decision to proceed to the E&MD phase. Conducted MS II decision to proceed to the E&MD phase of MORIAH. Initiated fabrication of the MORIAH EDMs. Provided engineering and management support to the program. Three MORIAH EDMs are funded under this sub-project.

DATE: February 1999

BUDGET ACTIVITY: 5 **PROGRAM ELEMENT: 0604512N** **PROJECT NUMBER: W2232**
PROGRAM ELEMENT TITLE: Shipboard Aviation Systems **PROJECT TITLE: CV Launch & Recovery Sys**

2. FY 1999 PLAN:

- (U) ($ 400) Complete outstanding ICOLS/IFLOLS OPEVAL issues, if any. Complete documentation for MS III decision to proceed to FRP. Conduct MS III decision to proceed to FRP for the ICOLS/IFLOLS. Provide pre-production support for the unit installed on USS GEORGE WASHINGTON (CVN 73). Provide engineering and management support to the program, particularly for the transition from the E&MD phase to the production phase.

- (U) ($1,000) Complete TECHEVAL of the CV/CVN variant of the ISIS EDM on USS THEODORE ROOSEVELT (CVN 71) and conduct an Operational Assessment (OA). Complete documentation for MS III decision to proceed to LRIP. Conduct MS III to proceed to LRIP of the CV/CVN Variant of ADMACS/ISIS. Provide pre-production support for the unit installed on USS THEODORE ROOSEVELT (CVN 71). Provide engineering and management support to the program, particularly for the transition from the E&MD phase to the production phase.

- (U) ($2,600) Complete installation and check-out of the CV/CVN variant of the ADMACS EDM on USS GEORGE WASHINGTON (CVN 73). Conduct TECHEVAL and OPEVAL of the ADMACS/ISIS EDM on USS GEORGE WASHIGNTON (CVN 73). Prepare documentation for In-Process Review (IPR) to proceed to FRP. Conduct IPR decision to proceed to FRP of the CV/CVN Variant of ADMACS/ISIS. Provide integration support for the various ADMACS increments under development. Provide engineering and management support to the program, particularly for the transition from the E&MD phase to the production phase.

- (U) ($1,848) Complete documentation for MS II decision to proceed to the E&MD phase of ALRCS. Conduct MS II decision to proceed to the E&MD phase of the ALRCS EDM. Initiate the design of the ALRCS EDM. Complete Allocated Baseline Specifications and initiate detailed system/component specification and drawing development. Provide engineering and management support to the program.

- (U) ($1,867) Complete documentation for MS II decision to proceed to the E&MD phase of the LHA/LHD variant of the ADMACS/ISIS. Conduct MS II decision to proceed to the E&MD phase of the LHA/LHD Variant of the ADMACS/ISIS EDM. Initiate the design and integration of the LHA/LHD variant of the ADMACS/ISIS EDM. Provide engineering and management support to the program.

- (U) ($ 700) Complete fabrication of the MORIAH EDMs, perform qualification testing, and install on two ships for TECHEVAL. Issue production RFP and evaluate proposals. Provide engineering and management support to the program.

- (U) ($ 15) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 5 **PROGRAM ELEMENT: 0604512N** **PROJECT NUMBER: W2232**
PROGRAM ELEMENT TITLE: Shipboard Aviation Systems **PROJECT TITLE: CV Launch & Recovery Sys**

3. FY 2000 PLAN:

- (U) ($2,300) Design, procure, and integrate selected sensors and subsystem prototypes of the ALRCS EDM. Provide engineering and management support to the program. ALRCS EDM funded under this sub-project.

- (U) ($2,800) Continue the design and integration of the LHA/LHD variant of the ADMACS/ISIS EDM. Complete installation and check-out of the LHA/LHD variant of the ADMACS EDM. Provide engineering and management support to the program. LHA/LHD ADMACS/ISIS EDM funded under this sub-project.

- (U) ($ 320) Complete TECHEVAL of the MORIAH EDM and conduct an Operational Assessment (OA). Complete documentation for MS III decision to proceed to LRIP. Conduct MS III decision to proceed to LRIP of the MORIAH. Award LRIP contract to manufacture MORIAH production systems. Conduct OPEVAL of the MORIAH EDM. Prepare documentation for IPR to proceed to FRP. Provide engineering and management support to the program.

- (U) ($3,632) Complete documentation for MS II decision to proceed to E&MD. Conduct Milestone II decision to proceed to the E&MD phase of the VISUAL EDM. Award contract to initiate the design and integration of the VISUAL EDM. Provide engineering and management support to the program. CV/CVN VISUAL EDM funded under this subproject.

DATE: February 1999

BUDGET ACTIVITY: 5 **PROGRAM ELEMENT: 0604512N** **PROJECT NUMBER: W2232**
PROGRAM ELEMENT TITLE: Shipboard Aviation Systems **PROJECT TITLE: CV Launch & Recovery Sys**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	8,931	8,531	9,213
(U) Appropriated Value:	8,931	8,531	
(U) Adjustments from President's Budget:	-157	-101	-161
(U) FY 2000 President's Budget Submit:	8,774	8,430	9,052

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 decrease of $157 thousand reflects $33 thousand for the Small Business Innovation Research (SBIR) assessment and $124 thousand for reprogramming for other Navy requirements. FY 1999 decrease of $101 thousand reflects Congressional undistributed reductions. FY2000 decrease of $161 thousand reflects pricing adjustments.

(U) Schedule:

LRLS MS III 2Q/98	LRLS MS III 3Q/98
ADMACS CDR 3Q/98	ADMACS CDR 4Q/98
ALRCS CDR 4Q/99	ALRCS CDR 2Q/00

Milestone changes: The ICOLS / LRLS EDM installation on USS CARL VINSON (CVN 70) was completed in 1Q FY 1998 vs 4Q FY 1997 as a post availability installation due to workload constraints at Puget Sound Naval Ship Yard, delaying DT until 2Q FY 1998. MS III was postponed until 3Q FY 1998 because of technical difficulties with the stabilization platform on CVN 70. ADMACS CDR was delayed one quarter due to staffing problems created by simultaneously planning and installing of EDMs on two aircraft carriers. The ALRCS CDR was delayed from 4Q/99 to 2Q/00 due to an extension of the design and fabrication performance period. All other changes were made to provide additional program details.

(U) Technical: Not applicable

DATE: February 1999

BUDGET ACTIVITY: 5 | **PROGRAM ELEMENT: 0604512N** | **PROGRAM ELEMENT TITLE: Shipboard Aviation Systems** | **PROJECT NUMBER: W2232** | **PROJECT TITLE: CV Launch & Recovery Sys**

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
OP,N (PE 0204216N, Aircraft Launch and Recovery Equipment)									
	4,692	19,223	19,263	26,728	20,341	20,302	19,587	18,905	35,309

Related RDT&E

(U) P.E. 0603512N (Carrier Systems Development)

DATE: February 1999

BUDGET ACTIVITY: 5 **PROGRAM ELEMENT: 0604512N** **PROJECT NUMBER: W2232**
PROGRAM ELEMENT TITLE: Shipboard Aviation Systems **PROJECT TITLE: CV Launch & Recovery**

(U) D. ACQUISITION STRATEGY:

LRLS is a Commercial Off-the-Shelf (COTS) procurement. The Navy prepared a performance specification and competitively awarded a fixed-price contract to deliver 3 EDMs in FY 1997, with fixed-price production options.

IFLOLS is a Technical Data Package (TDP) procurement. The Navy prepared a complete technical data package, based on the EDMs delivered in FY 1997, which will be submitted for bid by Hughes Technical Services in Indianapolis, IN under the BRAC privatization program.

ADMACS/ISIS is being designed and integrated by the Navy. The Navy will be procure COTS hardware/software from multiple sources, integrate the COTS hardware/software, and deliver to Navy shipyards for installation.

MORIAH is a COTS procurement. The Navy is preparing a performance specification, based on the EDMs, and will competitively award a fixed-price contract to deliver production systems.

VISUAL is a COTS procurement. The Navy is preparing a performance specification and will competitively award a fixed-price contract to deliver EDMs, with fixed-price production options.

ALRCS is a teaming procurement with Newport News Shipbuilding. The Navy is preparing a performance specification and the ALRCS Team will integrate and test the system. Production systems will be competitively procured.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 5 | **PROGRAM ELEMENT: 0604512N** | **PROGRAM ELEMENT TITLE: Shipboard Aviation Systems** | **PROJECT NUMBER: W2232** | **PROJECT TITLE: CV Launch & Recovery**

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	To Complete
(U) Program Milestones	LRLS: 3Q MSIII MORIAH: 4Q MSII	IFLOLS: 1Q MSIII CV/CVN ADMACS/ ISIS: 2Q MSIII ALRCS: 2Q MSII LHA/LHD ADMACS/ ISIS: 2Q MSII	MORIAH: 4Q MSIII	
(U) Engineering Milestones	CV/CVN-ADMACS/ ISIS CDR: 4Q MORIAH PDR: 4Q	LHA/LHD ADMACS/ ISIS CDR: 4Q MORIAH CDR: 4Q ALRCS PDR 3Q	ALRCS CDR: 2Q VISUAL CDR: 4Q	
(U) T&E Milestones	IFLOLS OT (10/97 - 04/98) LRLS DT (1/98 - 2/98) ISIS DT (4/98 - 7/98)	ISIS OA (11/98) CV/CVN-ADMACS/ ISIS DT (3/99 - 7/99) CV/CVN-ADMACS/ ISIS OT - 8/99 MORIAH DT (1/99 - 8/99)	MORIAH OT (4/00 - 6/00)	
(U) Contract Milestones	LRLS: 3Q FRP Awd	IFLOLS: 1Q FRP Awd CV/CVN ADMAC/ ISIS: 2Q LRIP Awd	MORIAH: 2Q LRIP Awd VISUAL: 1Q EDM Awd CV/CVN ADMAC/ ISIS: 1Q FRP Awd	MORIAH 1Q FY01 FRP Awd

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS **DATE: February 1999**

BUDGET ACTIVITY: 5 **PROGRAM ELEMENT: 0604512N** **PROJECT NUMBER: W2232**
PROJECT TITLE: CV LAUNCH & RECOVERY

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Design, Manufacturing	WX	NAWCAD - LKE	26,434	8,215	12/31/98	8,852		CONT.	CONT.	
Design, Manufacturing	FP	Raytheon	4,475	-0-	12/96	-0-		4,475	4,475	
Subtotal Product Development			**30,909**	**8,215**		**8,852**		**14,250**	**14,250**	
Remarks:										
ALRE PROGRAM SUPPORT			580	200		200		CONT.	CONT.	
Subtotal Support			**580**	**200**		**200**		**CONT.**	**CONT.**	
Subtotal Test & Evaluation			**0**	**0**		**0**		**0**	**0**	
Remarks:										
Subtotal Management			**0**	**0**		**0**		**0**	**0**	
SBIR ASSESSMENT				15		0				
Remarks:										
Total Cost			**31,489**	**8,430**		**9,052**		**CONT.**	**CONT.**	